EDA

En Route Descent Advisor

Purpose:
Provide controllers with advisories for precision arrival metering

Capabilities:
- Displays "meet-time" advisories involving speed, altitude, and heading maneuvers
- Integrates with TMA timeline display for metering conformance feedback
- Displays advised routing along with top-of-descent location
- Incorporates strategic conflict avoidance into advisories for metering, at controller's discretion

Users:
En route sector controllers

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Overview

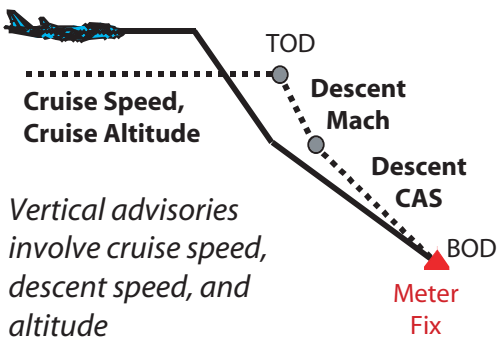
The En Route Descent Advisor is a CTAS tool that assists controllers with metering arrival aircraft in transition from Center to TRACON airspace. Specifically, EDA generates maneuver advisories to deliver aircraft very accurately to an arrival-metering fix located at the TRACON boundary. EDA works in conjunction with the CTAS Traffic Management Advisor (TMA), which generates the precise schedules and sequences that EDA targets for optimal throughput into the TRACON. EDA is capable of generating explicit "meet-time" maneuver advisories based on combinations of speed, altitude, and heading degrees of freedom. EDA constructs advisories that satisfy ATC constraints while remaining as fuel-efficient as possible for airspace users. In addition to its meet-time capabilities, EDA provides automated conflict resolution by presenting advisories that are predicted to put aircraft on conflict-free trajectories to the metering fix. By making use of accurate CTAS trajectory predictions involving aircraft type, atmosphere, and procedures, EDA supports both strategic and tactical decision making with time horizons up to 25 minutes.

Benefits

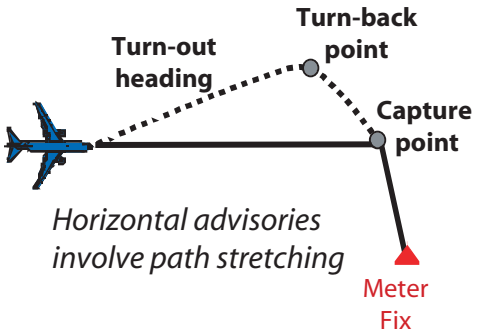
Studies suggest that EDA can lead to substantial benefits in capacity, fuel-efficiency, and controller productivity. Capacity benefits are achieved through accurate TRACON delivery in accordance with a TMA plan that is optimized for maximum throughput to the runway. Fuel efficiency is achieved through EDA's minimum-fuel trajectory planning algorithms, similar to those found in aircraft Flight Management Systems (FMS). Controller benefits are derived from the predictive capabilities of EDA, which allow for metering problems to be resolved further upstream than is possible today without automation. Early detection and resolution of metering-related problems can help achieve a more equitable distribution of controller workload between upstream and downstream sectors. With assistance from EDA under high-workload metering conditions, controllers will be able to focus additional attention on non-metering tasks, such as responding to changing weather and airspace conditions, and accommodating user route preferences.

Research & Development

EDA research is supported by NASA's Airspace Systems Program. EDA is being implemented within CTAS through a series of prototype builds. An initial capability has been implemented within the CTAS research baseline (March 2002). The goal over the next two years is to build a working EDA tool, capable of supporting controller-in-the-loop evaluations with both live and simulated air traffic (September 2004). ARTCC field-test evaluations and implementation on the FAA Display System Replacement (DSR) are anticipated beyond 2004. Following initial field trials, integration with FMS over two-way data-link will be pursued in order to provide additional benefits to controllers and airspace users.



Vertical advisories involve cruise speed, descent speed, and altitude



Horizontal advisories involve path stretching